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Title:

Prediction of Bird Impact behavior of a wing leading edge through Different bird models using Altair RADIOSS

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Bird Strike simulations are increasingly being used for the design of leading edges of civil aircraft, since conducting bird strike tests is expensive and time-consuming. Major issues in bird impact simulation are the modeling of the bird, the development of material models for the target and models for capturing rivet failures at different fastener locations. This paper discusses various approaches for bird modeling available in ALTAIR RADIOSS: Lagrangian, Arbitrary Lagrangian Eulerian (ALE), and Smooth Particle Hydrodynamics (SPH) techniques. Bird impact studies on a rigid flat plate found in literature were used for the comparative study on the bird modeling techniques. Based on this study, the SPH model was chosen for the prediction of bird impact behavior on a typical aircraft wing leading-edge. The SPH model predicted the impact behavior of a leading-edge for 115 m/s bird strike accurately. The leading-edge deformation characteristics predicted by the model agreed well with test data.